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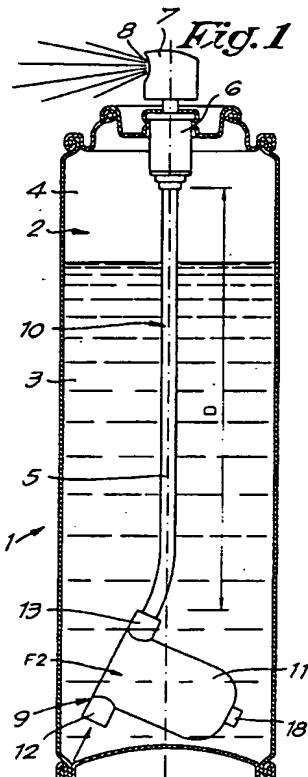
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(54) Spray can.

(57) Spray can consisting of a reservoir (2), a riser pipe (5) in the reservoir (2) and a valve (6) connected to the riser pipe (5), characterized in that the riser pipe (5) is provided with a pressure regulator (9).



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The present invention concerns a spray can.

As is known, conventional spray cans mainly consist of a reservoir which is meant to supply the medium to be atomized, whereby this reservoir is provided with a riser pipe and a valve connected to the riser pipe. The spray can is hereby put under pressure by partly filling the reservoir with a gas under pressure. It is known that with a full spray can this pressure must be relatively high, for example 12 bar, so as to obtain that, with an almost empty spray can, there is still enough pressure to displace the medium to be atomised from the reservoir of the spray can, whereby the generally prevailing aerosol legislation should also be taken into account, which says that every spray can should contain 60% fluid filling. The minimum required pressure is usually 3.5 to 4 bar.

Since, at the start, the pressure in the reservoir is high, this causes the medium to be atomized with an undesired great force when the spray can is used.

In order to remedy said disadvantage, it is known to build in a pressure regulator in the valve of the spray can.

This solution is disadvantageous, however, in that when the valve is operated, the medium from the reservoir is atomized in a sputtering manner, and this for various reasons. A first reason consists in that when the valve is opened, shut respectively, the medium to be atomized undergoes a sudden pressure change. A second reason consists in that the surface of the pressure regulator where the pressure can act on is very small, such that faults, for example due to contamination, are very quickly felt.

The present invention aims a spray can which does not have the above-mentioned disadvantages.

To this end the invention concerns a spray can, consisting of a reservoir, a riser pipe in the reservoir and a valve connected to the riser pipe, characterized in that the riser pipe is provided with a pressure regulator.

Because the pressure regulator is not built in in the valve of the spray can, but is provided at the height of the riser pipe, the connection between the pressure regulator and the valve acts as a buffer zone and a compensator, as a result of which better outflow characteristics are obtained when said valve is excited, whereby the risk of a sputtering action is reduced.

The fact that the pressure regulator is not built in in the valve is also advantageous in that standard valves can be used for the spray cans.

Because the pressure regulator according to the invention is situated in the reservoir, it can be made bigger than a pressure regulator which is built in in the valve, as a result of which a larger pressure-sensitive surface can be provided for to

control the pressure regulator, which has for a result that the pressure regulator is less sensitive to faults.

According to a preferred embodiment, the pressure regulator is situated at a distance from the valve in order to obtain a sufficiently large buffer zone between the pressure regulator and the valve. More in particular, the pressure regulator is preferably mounted at the entrance of the riser pipe, such that the riser pipe functions entirely as a buffer zone. The buffer effect is hereby reinforced by the elastic expansion of the riser pipe which is usually made of synthetic material.

Preferably, the pressure regulator used hereby consists of a housing with an entrance and an exit; a valve which is placed between the entrance and the exit; and means which control said valve as a function of the pressure at the exit, in particular which make it possible for the valve to open, to further open respectively, when the pressure at the exit drops under a certain, preferably adjustable value. These last means may consist of a pressure chamber with a movable wall which provides for the movement of the valve of the pressure regulator. In this case the pressure whereby the valve of the pressure regulator opens, closes respectively, can be easily set by providing the required pressure in the above-mentioned pressure chamber, without the pressure regulator having to undergo any constructional changes. As a result, the pressure regulator offers the advantage that it can be used for different pressure heights without having to undergo any constructional changes, as opposed to the known pressure regulators which are built in in the valve of the spray can, which, as is known, are only suited for one particular pressure.

In order to better explain the characteristics according to the invention, by way of example only and without being limitative in any way, the following preferred embodiments are described with reference to the accompanying drawings, in which:

figure 1 shows a spray can according to the invention;
 figure 2 shows a view of the part which is indicated in figure 1 with the arrow F2, to a larger scale and as a section;
 figure 3 shows a variant of the part which is represented in figure 2;
 figure 4 shows another spray can according to the invention.

As shown in figure 1 the spray can 1 according to the invention consists of a reservoir 2 in which the medium 3 to be atomized and the propellant 4 are supplied, a riser pipe 5 and a valve 6 which is connected to the riser pipe 5. The valve 6 is operated by means of a pressure button 7 or such which is provided with a spray opening 8.

The spray can 1 according to the invention is special in that the riser pipe 5 is provided with a pressure regulator 9, such that between the pressure regulator 9 and the valve 6 a connection 10 is always provided in which there is a constant or almost constant pressure, which is equal to the regulating pressure of the pressure regulator 9, whereby the connection 10, no matter how small, functions as a buffer zone.

In order to make optimum use of said buffer action, the pressure regulator 9 is preferably mounted at a certain distance D from the valve 6. According to the most preferred embodiment the pressure regulator 9 is situated at the entrance of the riser pipe 5 as shown in figure 1, such that the riser pipe 5 is entirely used as buffer zone.

In order to further improve the buffer action a riser pipe 5 is preferably used which is deformable under the influence of pressure changes, for example a riser pipe made of an elastic synthetic material.

The pressure regulator 9 can be of any type whatsoever. As represented in figure 2, it preferably consists of a housing 11 with an entrance 12 and an exit 13, a valve 14 which is situated between the entrance 12 and the exit 13, and means 15 which control the valve 14 as a function of the pressure at the exit 13, in particular which do not allow the valve 14 to open, to further open respectively, until the pressure at the exit 13 drops under a certain value.

The above-mentioned means 15 may hereby consist of a pressure chamber 16 which can be filled with a certain amount of gas, whereby said pressure chamber 16 has a moveable wall 17, preferably a membrane, which controls the movement of the valve 14. The pressure chamber 16 can be filled by means of a lockable mouth 18.

The valve 14 may be of any type whatsoever and may be mounted in different places in the housing 11. Naturally, the exit 13 is connected with a room 19 which borders on the moveable wall 17, in particular on the side which is situated opposite to the room 16, whereby the pressure in the room 19 determines the position of the wall 17 and the valve 14. The valve 14 is applied in a wall 20 between the room 19 and a space 21 which is connected with the entrance 12.

In the embodiment shown in figure 2 the valve 14 consists of a valve head 22 which works in conjunction with an opening 23 in the wall 20 and which is attached to the membrane 17 by means of a valve stem 24 and a membrane dish 25.

The working and the use of the spray can 1 can be easily derived from figures 1 and 2.

In a state of rest the valve 6 is shut. In this case, the pressure regulator 9 makes sure that a constant pressure is maintained in the connection

10.

As the valve 6 is opened the medium which is present in the connection 10 is atomized, whereby the pressure in the connection 10 decreases, and thus also in the room 19, with as a result that the wall 17 from figure 2 moves to the left under influence of the pressure in the pressure chamber 16, as a result of which the valve 14 is opened and the medium 3 to be atomized can leave the reservoir 2. If the pressure in the room 19 becomes too high, however, the wall 17 moves back to the right as a result of which less medium is supplied to the room 19. It is clear that in this way an almost constant pressure is maintained in the room 19.

Figure 3 shows a variant of the pressure regulator 9 whereby the valve 14 consists of a valve stem 26 which works in conjunction with a sealing 27 in the opening 23 and which is provided, over a certain length, at a distance from its free end 28, with an axial recess 29. Figure 3 shows the valve 14 when it is shut. When it is opened the valve stem 26 is moved to the left and the recess 29 forms an open connection between the space 21 and the room 19.

It should be noted that the valve 14 may have a leak. Such a leak has no or almost no negative effect on the working of the spray can. When the valve 6 is shut, a high pressure is built up in this case at the exit 13 and in the connection 10 which equals the pressure in the spray can. As the valve 6 is opened this pressure drops immediately, however, and the pressure is further regulated by means of the pressure regulator 9.

The fact that the valve 14 may have a leak is advantageous in that this valve does not need to be made with great precision. In order to allow for a smooth movement of the valve 14, a deliberately loose fit may even be provided. Thus, the above-mentioned sealing 27 is not strictly necessary.

It is clear, however, that the maximum leakage delivery should not exceed the minimum delivery during the atomization.

It is also clear that the pressure regulator 9 should not be necessarily provided at the bottommost end of the riser pipe 5, but can also be mounted in the middle of the riser pipe as represented in figure 4.

The present invention is in no way limited to the embodiments described by way of example and shown in the accompanying drawings; on the contrary, such a spray can can be made in various forms and dimensions while still remaining within the scope of the invention.

55 Claims

1. Spray can consisting of a reservoir (2), a riser pipe (5) in the reservoir (2) and a valve (6)

connected to the riser pipe (5), characterized in that the riser pipe (5) is provided with a pressure regulator (9).

2. Spray can according to claim 1, characterized in that the pressure regulator (9) is situated at a distance (D) from the above-mentioned valve (6). 5

3. Spray can according to claim 2, characterized in that the pressure regulator (9) is situated at the entrance of the riser pipe (5). 10

4. Spray can according to any of the above claims, characterized in that the riser pipe (5) consists of an elastic synthetic material. 15

5. Spray can according to any of the above claims, characterized in that the pressure regulator (9) mainly consists of a housing (11) with an entrance (12) and an exit (13), a valve (14) which is placed between the entrance (12) and the exit (13), and means (15) which control said valve (14) as a function of the pressure at the exit (13). 20

6. Spray can according to claim 5, characterized in that the above-mentioned means (15) mainly consist of a pressure chamber (16) with a moveable wall (17) which works in conjunction with the valve (14) of the pressure regulator (9), as well as a room (19) which is connected with the exit (13) of the pressure regulator (9) and which borders on the wall (17), such that the pressure in this room (19) determines the position of the valve (14). 25

7. Spray can according to claim 6, characterized in that the moveable wall (17) consists of a membrane. 30

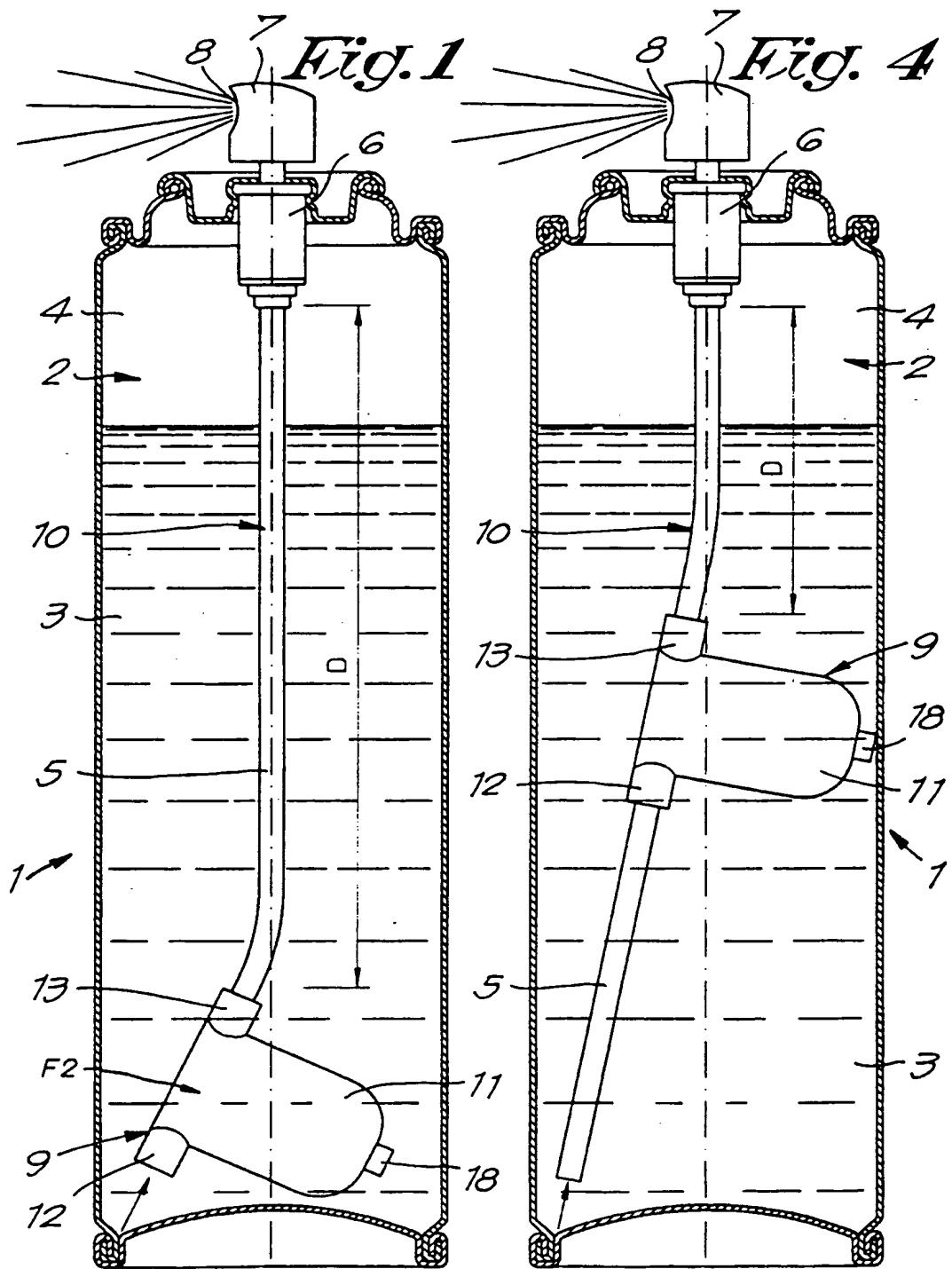
8. Spray can according to claim 6 or 7, characterized in that the pressure chamber (16) has a lockable mouth (18). 35

9. Spray can according to any of claims 6, 7 or 8, characterized in that the valve (14) consists of a valve head (22) which is attached to the moveable wall (17) by means of a valve stem (24), whereby the valve head (22) works in conjunction with an opening (23) which provides for a connection between the entrance (12) and the exit (13) of the pressure regulator (9). 40

10. Spray can according to any of claims 6, 7 or 8, characterized in that the valve (14) mainly consists of a valve stem (26) which is attached to 45

the moveable wall (17) and which works in conjunction with an opening (23) which provides for a connection between the entrance (12) and the exit (13) of the pressure regulator (9), whereby the valve stem (26), at a distance from its free end (28), has an axial recess (29) which, due to the position of the valve stem (26) provides for an adjustable passage between the above-mentioned entrance (12) and exit (13). 50

11. Spray can according to any of the above claims, characterized in that the pressure regulator (9) shows a leak, whose maximum leakage delivery does not exceed the minimum delivery when the spray can is used. 55



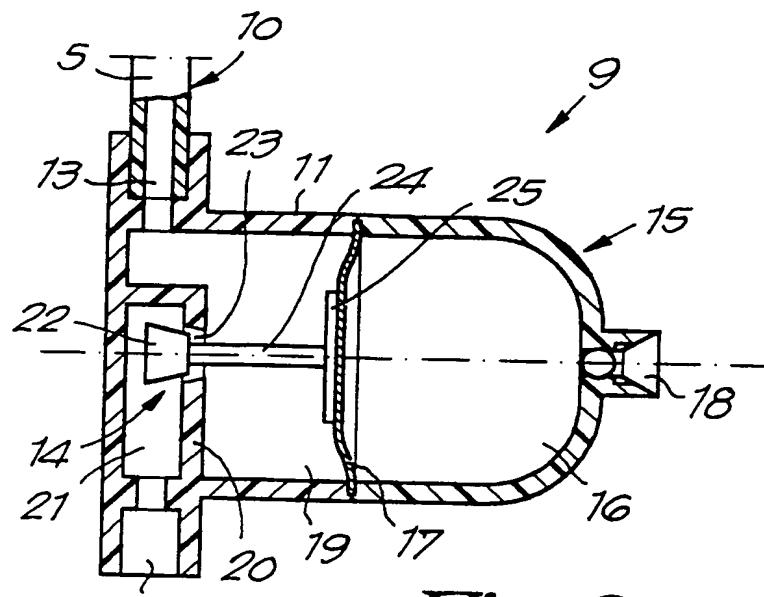


Fig. 2

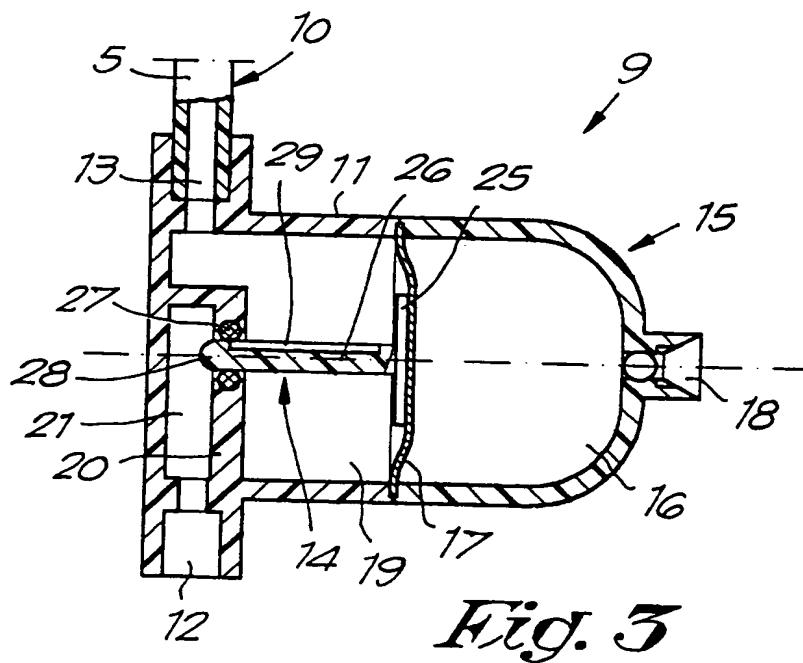


Fig. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 93 20 2366

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.CLS)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	WO-A-82 00450 (WERDING) * abstract; figures *	1-7 8-10 ---	B65D83/44
Y	EP-A-0 332 389 (NATIONAL RESEARCH DEVELOPMENT CORP.) * abstract; figure 1 *	8,9 ---	
Y	EP-A-0 446 973 (JAICO C.V. COOPERATIVE VENNOOTSCHEAP) * figures 3-6 *	10 -----	
			TECHNICAL FIELDS SEARCHED (Int.CLS)
			B65D
The present search report has been drawn up for all claims			
1	Place of search THE HAGUE	Date of completion of the search 22 November 1993	Examiner MARTIN, A
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons R : member of the same patent family, corresponding document	